THE ART

OF

Making Pens Scientifically,

ILLUSTRATED BY

AN ENGRAVING,

By which Ladies and Gentlemen, and particularly Youths at School, may inſtantly learn to make PENS to ſuit their own Hands.

To which are added,

GENUINE RECEIPTS for MAKING INKS,

Of the moſt elegant and durable Qualities.

Alſo,

DIRECTIONS for SECRET WRITING.

By JOHN WILKES, Pen-Cutter.

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THE ART
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HAD I not taken to the profeſſion of a Pen-Cutter it never would have occurred to me that there could have been ſo much to be ſaid on making PENS; and the improvement which this little inſtrument may receive, is, I think, worthy the attention of ſome, particularly as it is ſo very eſſential to the early practice of Writing, and lays the foundation for Youth to become good Writers. And as it is the duty of every one to aſſiſt the riſing generation, I hope *that* will be a ſufficient

apology for my introducing this little Tract to public notice, not having ſeen any thing publiſhed on the ſame ſubject, except in French or German. I therefore beg leave to offer my humble attempt to illuſtrate what has fallen under my notice; and every body muſt know that a free and pleaſant Pen is a very deſirable object, and ſought after by moſt people; indeed a Pen may boaſt of being the inſtrument employed in the moſt important affairs, and which gives force to the moſt diſtant connections. And in the great and uſeful diſcoveries of Writing and Printing the utility of the Pen muſt be univerſally acknowledged. Why, then, ſhould it be ſo neglected as it is? or, at leaſt, why not reſcued from the obſcurity in which

which it has ſo long been buried, eſpecially when we ſee all its accompaniments improving daily? The fine wove Paper, hot preſſed, and that ſo elegantly adorned on its margin for Ladies' uſe, invite the fair hand to write as neatly as poſſible on its pure ſurface, that it may appear altogether in uniformity. And here I muſt remark, that Ladies not being their own penmakers, of courſe claim the firſt attention; their Pens ſhould be cut by an experienced hand, ſhaped, nibbed, and choſen from that ſort of quills beſt adapted to write ſuch fine hands as Ladies generally wiſh.

As one improvement frequently produces another, it now ſeems the prevailing faſhion for Ladies to vie with each

each other in the neatneſs of their writing, and in this age of improvement it is highly proper that every thing ſhould correſpond, and what has been heretofore called the *faſhionable ſcrawl* is now exploded by Ladies of the higher rank, and no doubt but thoſe of all ranks will do the ſame; this is a reformation of great utility, and it muſt be allowed that letters written in a neat hand from perſons we never ſaw, gives us ſome idea of their manners and external appearances. Indeed that careleſs way of writing has been the cauſe of many miſtakes and much diſappointment both in domeſtic and commercial concerns, and I have frequently known inſtances wherein a ſecond letter has paſſed before an explanation could take place.

I once

I once remember an inſtance of a celebrated performer being ſent for to Oxford to perform at the oratorio; the letter which was ſent to engage him was written with the abreviation Oxon inſtead of Oxford, and was ſo ill put together that the perſon took it for Exon, which is the contraction for Exeter, and poſted down there; by this ſo much time was loſt that they were obliged to do without the performer at Oxford, to the great injury of the performance and all parties concerned. Suppoſe a letter under ſimilar circumſtances had been ſent to a counſellor, the ſame diſappointment would have occurred, and a cauſe of very great importance might have been thereby loſt.

Theſe,

Theſe, and many others that might be adduced, are forcible arguments why parents ſhould have their children well grounded in the Rudiments of Writing, and to attain this with greater facility and perfection it is of courſe neceſſary that good Pens ſhould be had.

It may be further neceſſary to obſerve, that Pens made up for ſale are much, and very juſtly, complained of, and want amendment. Few people can write with the Shop Pens before they have made them over again; and thoſe brought up to the trade of Pen-cutting, are ſo formal in the ſhape, and ſo mechanical, that one would think their Pens were cut with an engine, an attempt that was once made, but by which many

many thouſand quills were ſpoiled, without any benefit to the inventor or improvement to the Public. Thoſe who at preſent profeſs Pen-cutting have been taught by their grand-fathers and great-grand-fathers; and their method, like their voice or their hand-writing, has never received any amendment; nor is it likely to be ſo, when they are cut moſtly by women, or people not brought up to the uſe of the Pen, and their natural aim is at expedition.

The proper time, in my opinion, for a Youth to learn Pen-making is when he has juſt begun to write. When I was young and at ſchool I took great delight in making my own Pen and keeping my Knife in good order, and

this gave me a very perfect idea of the formation of a Pen, as well as to know how to chuſe a good Quill; for as the hand-writing of every one differs from that of another, it is no wonder that the Sale Pens, being made all on one principle, can ſuit but few hands; thoſe therefore, who make their own Pens have a great advantage, provided they keep their Knives in the beſt order poſſible, otherwiſe they can never make a good Pen, for unleſs the Knife cuts exceeding ſmooth, the Pen will make a ragged ſtroke.

That it is very unpleaſant to meet the leaſt interruption when we have ſet down to write, is a fact that muſt be univerſally admitted; it therefore becomes

comes every Penman to ſee that thoſe articles he may want are in readineſs and in proper order, for interruptions frequently break off or disjoint the ſubject matter in the mind, ſo as to cauſe a chaſm in the inditing, and the loſs, perhaps, of a word or ſentiment, not ſo well ſupplied by another.

All theſe impediments may, however, be prevented, if the Ink were thrown out once a week and freſh Ink put into the ſtand, which ſhould be well rinced and dried, for the Ink is generally expoſed to much duſt, and by that means becomes thick, and clogs in uſing. But what I would moſt ſtrongly recommend is my PENMAN's BOX, which contains every uſeful article for his ac-

commodation, and what no writing-deſk ſhould be without; I have no doubt but every one, or at leaſt every friend to Penmanſhip, will think with me, and allow it to be a very neceſſary and commodious article for every young Lady or Gentleman, Merchant, Tradeſman, &c. and more particularly for Officers at ſea, where the reſources cannot be had which it contains, and theſe are in a ſtate of excellent preſervation, being ſecured from the ſea air, or duſt, two things which the Penknife cannot be kept too free from. The Penknife is in this Box far more ſecure than it ever is in the pocket, for every one knows it is then liable to be uſed for other purpoſes, and the edge is ſure to ſuffer; when the fine edge of a Penknife is blunted any

other

other way than by making Pens, it is not ſoon or eaſily reſtored, for, beſides the loſs of its edge, it frequently gets notched and broke. A good Penknife, like a muſical inſtrument, ſhould be kept in the higheſt ſtate of perfection, more particularly when it is remembered that a really good Penknife is a ſcarce article. I have taken infinite pains to aſcertain the temper of Penknives made by the moſt approved Cutlers of the preſent day, and I am happy to ſay that I have diſcovered, in the perſon of an old cutler, the moſt conſummate ſkill, and in his Knives the moſt ſuitable temper, which the Knives of his manufacture will, on trial, fully prove. This very judicious Mechanic I have engaged to furniſh my Penman's Box with the

the beſt Knives he can poſſibly make, and I hazard little in ſaying they will give the utmoſt ſatisfaction. Having thus been enabled to furniſh my Boxes with the beſt manufactured Penknives extant, my attention was next led to procuring ſuch Stones as were beſt adapted to the temper of the Knives they were intended to ſharpen. In the attainment of this very neceſſary article, which was of great conſequence in the completion of my Pen-making apparatus, I found great difficulty; having, however, formed a connection with a celebrated Mineraliſt in Derbyſhire, I have compleatly ſurmounted that difficulty by the receipt of a large quantity of ſtones of a particular kind, and ſuch as have been ſelected of a certain hardneſs.

neſs. For it muſt be acknowledged by every one, that whatever be the purpoſe for which any Knife or tool is uſed, the ſtone that is to give it an edge muſt be ſuited to it. The hone which will give to the razor a fine edge and make it ſhave ſmooth and pleaſant, would be too ſoft for a Penknife, that muſt attack a hard quill, which would break the edge of a razor to pieces; nor will a Penknife perform the buſineſs of a razor, the edge being too thick. The Knife that is uſed for cutting coarſe ſubſtances muſt be whet with a rough ſtone, and vice verſa; for joiners' tools a hard oil-ſtone is proper, and a ſteel for a butcher's knife, &c. There is a certain method in ſetting a Penknife, which hundreds who uſe that inſtrument are un-

unacquainted with, but which may be eaſily acquired by attention to the following directions: great care ſhould be taken to ſet the Knife ſo that it will cut ſmooth and fine, and turn out without going too deep, as, in the general way of ſetting, it will do, and cut off the point in ſhaving down the ſide; theſe things might all be avoided were Youth early inſtructed how to ſet a Penknife, which they certainly ſhould be. Few cutlers could ever, after making me a blade, ſet it for Pen-making, ſo that I have always been obliged to do it myſelf. A Knife for this purpoſe ſhould be ſet moſt on the outſide, making it a little convex, but not too much ſo; great care ſhould be taken not to give the Knife a wire edge, by ſetting it more

than

than it requires. But ſhould this happen, the beſt remedy is to draw it on the edge of the ſtone, then bring it up till it acquires its keenneſs again, and, after a good ſtrapping, it will have a better edge and ſtand longer than if made too keen, for then it breaks and by uſing will be full of notches. Here both an excellency and conveniency attends the ſtones I recommend, which is, that water is better adapted to them than oil.

I do not approve thoſe newly-invented ſtraps, faced with a compoſition, for improving the edge of a razor; they are frequently uſed for the Penknife, but they give it too thin an edge, a plain leather ſtrap will always be found to

anſwer the purpoſe far better. Having ſeen many of my friends and cuſtomers unable to nib their Pens in conſequence of their eye-ſight failing, or their hands becoming unſteady, I have invented a NIBBING INSTRUMENT, which has met the approbation of hundreds who have uſed it; its principle is ſo ſimple, and its effect ſo certain, that any one, after having uſed it once or twice, could nib a Pen in the dark, giving it a fine ſquare nib that will make a ſmooth and pleaſant ſtroke, equal to any Penknife. This inſtrument would be of the greateſt utility in ſchools, as it would ſave both time and quills, for a Pen, if properly cut, will bear twiçe nibbing. To Ladies, who cannot mend

their

their own Pens, this would prove a moſt uſeful aſſiſtant.

To the knowledge of Penmaking I wiſh to direct the early application of the riſing generation; to whoſe attention I principally addreſs this Treatiſe; and as it muſt be of ſervice to many to know how to make a good Pen, I preſume to ſay, that by adhering to the following directions, the reſult of my own practice, they will compleatly attain that deſirable object; and to render the acquiſition of this knowledge ſtill more eaſy, I have ſubjoined an Engraving of the different forms of Pens. And before we proceed to cutting, the mode of holding the Quill is an object

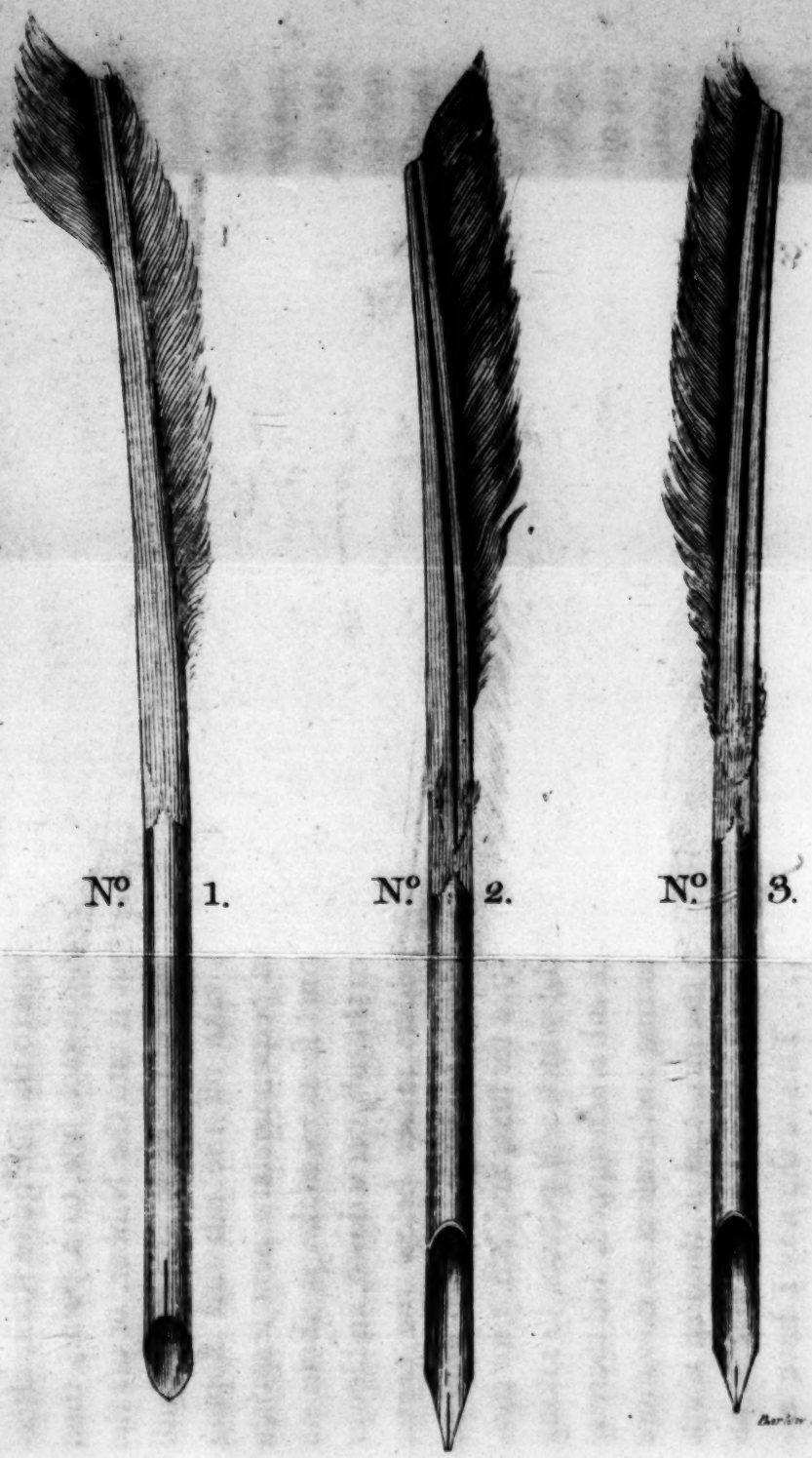
that ſhould be attended to, as it gives a ſteadineſs to the Knife.

The Quill ſhould be held between the fore finger and thumb of the left hand, letting it reſt on the firſt joint of the middle finger, which finger ſhould preſs on the thick part of the thumb, and againſt which finger the right thumb ſhould be placed firm; this in cutting the Quill will cauſe the two hands to act as an Inſtrument, giving power to the right hand by preſſing it on the left, and the Quill lying on the joint of the left middle finger, as on a block, may be turned round without being removed and kept ſteady to the Knife. The firſt cut of the Quill ſhould be from the back ſloping, about half

an

an inch, as No. 1, in the Plate; then with the Knife make a ſmall inciſion for the intended ſlit, as much in the centre as poſſible, and place your thumb pretty hard on the Quill about as far as the ſlit ſhould go, to prevent it going further, which ſhould be about three fourths up to the ſhoulders; then put in the tail of an office Knife, or in preference to that or any thing elſe, another Quill, then raiſe it like a lever or handle fixed in, with a very ſmall jerk, taking care not to put it through the ſlit, as that would prevent it cloſing at the Nib, which is ſo requiſite in making a fine Pen; then turning round the Quill cut off about an inch for the ſcoop or channel, as at No. 2, and form the ſhoulders exactly oppoſite each other, and cut from

from them to the nib quite ſtrait, afterwards ſhave each ſide to a point, then either put it into the Nibber, or uſe the keeneſt part of the knife, and if the Quill is thick take off the nib firſt ſloping and then perpendicular: next lengthen the channel ſo as to make it about an inch from the nib, cut it down, and lower the ſhoulders rather below the centre of the Quill, (obſerve the two finiſhed Pens, No. 2 for text, and No. 3 for runing hand,) which will prevent its taking too much ink when dipped, and thereby avoid blotting and cauſe it to flow more freely to the nib, and if the Pen is cut with a regular ſlope it will give it an elaſticity. This is the way I have always practiſed in cutting Pens for general uſe, widening the nib and lengthening



N.º 1. N.º 2. N.º 3.

Barlow sc.

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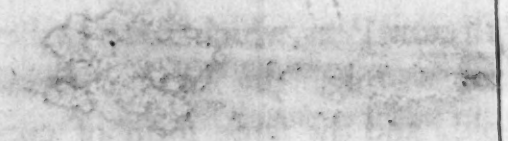

ening the ſlit; for large and ſmall hands, and for Ladies, I have always choſen a ſmall hard ſecond Quill, and ſometimes a large Pinion, as I always could draw them to a finer point than ſofter Quills, and make a clearer and finer ſlit, ſo that good ink will flow no faſter than the fineneſs of the nib will require it; and, with crow Pens, which many Ladies chuſe for writing, the ſame obſervations hold, and the ſame form of cutting as that for gooſe Quills, which, if ſkillfully cut, will make a very delicate ſtroke, they not being required to make thoſe ſwells and daſhes which men uſe in writing.

From the intercourſe I have had with amateurs and profeſſors of Penmanſhip,

ſhip, I have found it their general opinion, that a Pen cut and nibbed mathematically, with a clear and proportionate ſlit to the wedth of the nib, is the deſirable Pen. I might extend my obſervations by adducing many examples from the elaborate works I have peruſed on Pen-cutting, but all of ancient date, ſo much ſo, that from the various changes which have ſucceſſively happened ſince that time, the introduction of ſuch examples would not only exceed the limits I have propoſed to myſelf, but would not tend to illuſtrate the preſent practice of Pen-cutting.

I ſhall now, with all due deference to Writing-Maſters, offer my opinion reſpecting youths firſt learning to write.

Were

Were I to inſtruct young Ladies or Gentlemen to write, I would give them a ſoft Pen, and this for two reaſons: the firſt, becauſe it would teach them to lean lightly on their Pens, and ſecondly, it would cauſe them to dwell longer in forming the letters; for with ſuch a Pen it cannot be done haſtily, a habit to which youth are generally addicted, but they will uſe it as if they were drawing with a camel-hair pencil; they will take pains with each ſtroke, and proceed gently. When they are able to do this well, they ſhould be left to make and mend their own Pens, which time and practice will make familiar to them. People who are grown up, and can write with facility, do not, generally ſpeaking, ſufficiently aſſiſt youths who are

learning to write. Of writing, boys have ſeldom any ideas but ſuch as begin with their learning, or are given them by their tutors; hence it is plain the groundwork of writing is the formation of letters, and in this youth ſhould be very thoroughly inſtructed before they proceed to join them. There are many good writers who cannot make ſome letters ſo well as others, therefore I would recommend that all boys, at firſt beginning, ſhould be kept a much longer time to ſingle letters; indeed I would make them write whole copies of each letter, until they are perfect in the whole alphabet, and particularly with regard to capitals, which are a great ornament to writing; this I would have much attended to, for in this re-

ſpect

ſpect we ſee many good writers deficient in ſome, although they may make others very elegantly; indeed I know many, particularly Ladies, who write very pretty and neat hands, but cannot make certain capitals, nor this mark (&) in particular, which ſerves to ſupport my argument, that every letter, ſmall and large, and every figure, ſhould be a ſeparate copy. The formation of capitals, being ſo different from that of ſmall letters, requires a Pen cut accordingly: it ſhould be a kind of elaſtic Pen with a ſmooth nib, there being ſo many ſwells and bows, and it will often want the Penknife to take off a little of the ſides and nib, as a Pen wears out very much in ſtriking or flouriſhing, which is the way to make good capitals, for

the hand ſhould ſcarcely touch the paper, the letter being ſtruck like a flouriſh; and as there are nearly three ſcore letters, figures, &c. it muſt of courſe require both time and attention to arrive to perfection in each. Having thus gone through the firſt ſtage, the ſcholar proceeds to join the letters, ſo as to make words and ſentences, and this he will ſoon be able to do without any further inſtruction than that of his copy. Thoſe young Ladies and Gentlemen who are to learn the French, Italian, and Latin languages, after they can join the letters, ſhould write the French or Italian verbs, and ſuch parts of the grammar as will be of uſe to them whilſt learning thoſe languages; their leſſons in the ſpelling-book they ſhould

alſo

alſo copy and retain; and if they are to learn muſic, the characters ſhould be frequently written, as by that means they would become familiar therewith. This method will be found of great utility, and there is no more difficulty in it than in the common copies which moſt ſchools adopt. I think this would be ſowing, as it were, the ſeeds of learning in young minds, eſpecially thoſe who have retentive memories, as it would greatly aſſiſt them in their progreſs, for by ſo frequently writing the French verbs, with their various changes and terminations, they would retain ideas of the moods and tenſes, which are the greateſt helps in gaining a knowledge of that language.

In

In all pieces of mechaniſm the merit conſiſts in a regular arrangement and formation of the component parts; ſo it is in the making of good letters, and afterwards in duly adjuſting, or joining them, which ultimately produces good writing. And as no one can write a fine hand without often repairing the Pen, every Penman ſhould be amply provided with every neceſſary article for that purpoſe; as the Pen wears moſtly at the corners of the nib, that part being ſo much uſed in forming thoſe graceful ſtrokes that diſtinguiſh fine writing, the inſtructing ſcholars, therefore, to make and mend their own Pens, muſt appear indiſpenſible. To be able to do this effectually he ſhould have a good Knife, a Stone, and a Strap; the Knife ſhould be

be one that will not ſhut, for if it be of that kind it is kept in the pocket, and frequently uſed to cut apples, oranges, ſticks, &c. which renders it unſerviceable for the Pen. To remedy this inconvenience I have provided my PENMAN's BOX, which contains a Knife, Strap, Oil Bottle, Stone, piece of Sponge to clean it from grit or duſt, and ſome linen rag to wipe the Pens after uſing. Was this neceſſary article brought into general uſe, it would, in a ſhort time, ſave more than the coſt of the Box, beſides inducing a habit of cleanlineſs and care which cannot be too ſoon impreſſed on the minds of Youth, and thereby produce that neatneſs in the execution which never fails to diſtinguiſh a good Penman. Lord Cheſterfield ſays, in his

his "Advice to his Son," 'If a Youth be negligent at twenty he will be ſlovenly at thirty, and grow worſe as he grows older;' this is a proof of the truth of my aſſertion.

It is now the cuſtom in many very reſpectable ſchools, to let the ſcholars make their own Pens, and it is certainly an excellent cuſtom. And I would adviſe all thoſe who ſend children to writing ſchools to be rather liberal than otherwiſe, in order to give them an opportunity of practiſing on Quills; and as moſt ſchools, particularly day ſchools, are at an old fixed price, and Quills, like moſt other articles, being dearer, it cannot be ſuppoſed the maſters will

furniſh

furniſh more than are barely neceſſary for the ſcholars.

I find it very difficult to get real good Quills, ſuch as will give that ſatisfaction I wiſh to thoſe who honour me with their commands. I ſpare nither expence nor trouble in procuring them, and pay every poſſible attention to the making them into Pens, ſo as to pleaſe and ſuit the writer, if I know the hand they are wanted for; and whenever I ſucceed in this point, I always keep a few for patterns, that I may not miſtake afterwards, when more are wanted. I do not prefer the largeſt barrel Quills, they are not always the beſt; but like the bird that produces them, a middling one is to be preferred, The time of

moulting in autumn, is the beſt time for Quills, as they are then, like fruit when ripe, fit for uſe, but, from an eagerneſs to get money, the poor bird is often plucked before the Quills come to maturity, and the greater number of the fowls are killed before they attain their full growth. Thoſe Quills which are brought from Hambro' by Jews travelling through Poland, are the beſt that come to this country; a few good ones come from Ireland; ſome of thoſe from Hudſon's Bay are good ſtrong Quills; they may be eaſily known, both feather and ſtalk being black or of a duſky hue. Merchants export moſtly Quills, ſcarcely any Pens, becauſe, in a hot climate, Pens would dry and become uſeleſs before they were either ſold or uſed, excluſive

excluſive of the injury ſuſtained by package and carriage, and in the Eaſt and Weſt Indies they are an article that yield a good profit.

Having thus offered, with the greateſt deference, the foregoing obſervations, I now beg leave to ſubmit a few others with regard to INKS, truſting that ſome imformation and inſtruction may be derived therefrom.

I have before obſerved, that good Ink is abſolutely neceſſary for fine writing. Pens with very fine nibs require thin clear Ink, ſuch as will flow freely, for thick Ink leaves the Pen ſo ſlow as to impede the writer. In the Ink which I make and ſell I have endeavoured to

retain that fine dark raven colour which at firſt is of a bluiſh caſt, and dries a good black. I have alſo a fine Ink-Powder, which I can recommend, from long uſe, to be in as great perfection as any ever invented both for colour and durability. I have alſo a good Japan Ink, peculiarly adapted for directing parcels and boxes, with a ſtrong Pen made of a turkey Quill, which, for the conſpicuouſneſs of its colour, cannot be equalled; this, it muſt be acknowledged, is a very valuable property, as boxes and parcels go through ſo many hands; indeed I would recommend all perſons ſending goods by coaches, waggons, &c. to direct them in two places, for it often happens that by rubbing againſt each other, the directions are defaced,

defaced, and the goods loſt for want of knowing were they are to go.

Ink ſhould never be expoſed to froſt or the ſun, the former will ſpoil the beſt and the latter make it like iron-mould.

I ſhall now give ſome of the beſt Receipts for MAKING different INKS, all which will be found by experience to anſwer the purpoſe required, particularly the Sympathetic Inks, which may prove of infinite ſervice to many perſons who travel to foreign parts, and ſuch as may happen to fall into the hands of the enemy, as by that means relief might be obtained, and information conveyed which no other could effect.

Black

Black Ink being of that kind in moſt general uſe, I ſhall direct my attention to it firſt, and give ſuch directions for making and improving that uſeful article, as ſhall not fail to be of general utility. Theſe inſtructions, improvements, and obſervations, I have carefully ſelected from different writers on the ſubject, who have treated thereon at large.

Black Ink is generally made of an infuſion of galls, vitriolated iron, commonly called green vitriol or copperas, and gum arabic. The properties which this liquor ought to have, are, 1. To flow freely from the Pen, and ſink a little into the paper, that the writing be not eaſily diſcharged. 2. A very deep black,

black, which ſhould be as deep at firſt as at any time afterwards. 3. Durability, ſo that the writing may not be ſubject to decay by age. 4. Ink ſhould be deſtitute of any corroſive quality, that it may not deſtroy the paper, or go through it in ſuch a manner as to render the writing illegible. No kind of Ink, however, hath yet appeared which is poſſeſſed of all theſe qualities. The Ink uſed by the ancients was poſſeſſed of the ſecond, third, and fourth qualities above mentioned, but wanted the firſt. Dr. Lewis hath diſcovered its compoſition from ſome paſſages in ancient authors. Pliny and Vitruvius (ſays he) expreſsly mention the preparation of ſoot, or what we now call lamp black, and the compoſition of writing

Ink

Ink from lamp black and gum. Dioſcorides is more particular, ſetting down the proportions of the two ingredients, viz. three ounces of the ſoot to one of the gum. It ſeems the mixture was rolled into cakes, which, being dried in the ſun, were occaſionally tempered with water, as the cakes of Indian Ink, and many other colours, are among us for painting.

Dr. Lewis has thought the ſubject of Ink making not unworthy of his attention. From many experiments he infers, that the decay of Inks is chiefly owing to a deficiency of galls; that the galls are the moſt periſhable ingredient, the quantity of theſe, which gives the greateſt blackneſs at firſt (which is about equal

equal parts with the vitriol,) being inſufficient to maintain the colour: that for a durable ink, the quantity of galls cannot be much leſs than three times that of the vitriol; that it cannot be much greater without leſſening the blackneſs of the Ink: that by diminiſhing the quantity of water, the Ink is rendered blacker and more durable; that diſtilled water, rain water, and hard ſpring water, have the ſame effects; that white wine produces a deeper black than water; that the colour produced by vinegar is deeper than that by wine; that proof ſpirit extracts only a reddiſh brown tinge; that the laſt mentioned tincture ſinks into, and ſpreads upon the paper; and hence the impropriety of adding ſpirit of wine to ink, as is

frequently directed, to prevent mouldineſs or freezing: that other aſtringents, as oak bark, biſtort, ſloe bark, &c. are not ſo effectual as galls, nor give ſo good a black, the colour produced by moſt of theſe, excepting oak bark, being greeniſh: that the juice of ſloes does not produce a black colour with martial vitriol; but that, nevertheleſs, the writing made with it becomes black, and is found to be more durable than common Ink: that Inks made with ſaturated ſolutions of iron in nitrous, marine, or acetous acids, in tartar, or in lemon juice, were much inferior to the Ink made with martial vitriol: that the colour of Ink is depraved by adding quicklime, which is done with an intention of deſtroying any ſuperabundant

dant acid which may be ſuppoſed to be the cauſe of the loſs of the colour of Ink: that the beſt method of preventink the effects of this ſuperabundant acid is probably by adding pieces of iron to engage it; and that this conjecture is confirmed by an inſtance the author had heard, of the great durability of the colour of an Ink in which pieces of iron had long been immerſed: and laſtly, that a decoction of logwood, uſed inſtead of water, ſenſibly improves both the beauty and deepneſs of the black, without diſpoſing it to fade. The colour of Ink is found to be greatly injured by keeping it in veſſels made of copper or lead, and probably of any other metal, excepting iron, which the vitriolic acid can diſſolve.

The foregoing experiments point out the beſt proportions of the ingredients for making Ink. One part of green vitriol, one part of powdered logwood, and three parts of powdered galls. The beſt menſtruum is vinegar or white wine, though for common uſe water is ſufficient. If the Ink be required to be of a full colour, a quart, or at moſt three pints, of liquor, may be allowed to three ounces of galls, and to an ounce of each of the other two ingredients. Half an ounce of gum may be added to each pint of the liquor. The ingredients may be all put together at once in a convenient veſſel, and well ſhaken four or five times a day. In ten or twelve days the Ink will be fit for uſe, though it will improve by remaining longer on the

the ingredients. Or it may be made more expeditiouſly by adding the gum and vitriol to a decoction of galls and logwood in the menſtruum. To the Ink, after it has been ſeparated from the feculencies, ſome coarſe powder of galls, from which the fine duſt has been ſifted, together with one or two pieces of iron, may be added, by which its durability will be ſecured.

The following receipt, which differs in ſome reſpects from the foregoing, is recommended by Dr. Black:

Take powdered galls three ounces, logwood ſhavings and vitriolated iron of each one ounce, water from two to three pints, according to the degree of ſtrength

ſtrength required for the Ink. Before the boiling is finiſhed, throw in half an ounce of gum arabic, and when it is diſſolved ſtrain the liquor. As a means of preſerving the Ink from mould, Dr. Black directs about a quarter of an ounce of ſpirit of wine to be added; and likewiſe a little powdered cloves ground in a mortar with a little of the Ink.

Since the invention of printing much leſs attention than formerly has been paid to the making of Ink, ſo that now the art ſeems to be in a great meaſure loſt. This will appear from a compariſon of ſome ancient manuſcripts with the writings of modern times. It being of the utmoſt importance, however, that public records, wills, and other valuable

ble papers, which cannot admit of being printed, ſhould be written with Ink of a durable quality, this inattention ſeems to have been very culpable, and a reſtoration of the method of making writing Ink a very valuable acquiſition.

The before-mentioned inſtructions are undoubtedly the moſt approved for making good Black Ink; but ſhould they be deemed too prolix, I have added another Receipt of equal utility, and more conciſe:

To ſix quarts of rain, or river water, (but rain water is the beſt,) put one pound and a half of freſh blue galls of Aleppo, (for thoſe of Smyrna are not ſtrong enough,) bruiſed pretty ſmall;

eight

eight ounces of copperas, clean, rocky, and green; eight ounces of clean, bright, clear, gum arabic; and two ounces of roche allum: let theſe ſtand together in a large ſtone bottle, or clean ſtone pot, or earthen pot, with a narrow mouth to keep it free from duſt. Shake, roll, or ſtir it well once every day, and you will have an excellent Ink in about a month; and the older it grows the better it will be.

Ingredients for a quart: One quart of water, four ounces of galls, two ounces of copperas, and two ounces of gum, mixed and ſtirred as above. One ounce of gum has been found ſufficient, and the galls ſhould not be ground too fine, but left in coarſe lumps.

If

If you ſoak the green peeling of walnuts (at the time of the year when pretty ripe) and oak ſaw-duſt, or ſmall chips of oak, in rain water, and ſtir it pretty often for a fortnight, the water, ſtrained off and uſed with the ſame ingredients as above, will render the Ink ſtill ſtronger and better.

Having given the beſt poſſible Directions for making good Writing Ink, I ſhall now give thoſe for making another uſeful article, namely, Red Ink, which are as follow:

Take three pints of ſtale beer, in preference to vinegar, and four ounces of ground Brazil wood; ſimmer them together for an hour, then ſtrain it through

a flannel, and bottle it up (well ſtopped) for uſe.

Or you may diſſolve half an ounce of gum ſenega, or arabic, in half a pint of water; then put a pennyworth of vermillion into a ſmall gallipot, and pour ſome of the gum water into it, ſtir it well, and mix it together with a hair pencil to a proper conſiſtency; but it will not incorporate immediately, tho' by the next day it will; then having a clean Pen, dip it into the Ink, having firſt well ſtirred it with a pencil, and then you may uſe it. After the ſame manner you may make other coloured Ink, as blue, green, yellow, purple, &c. having different gallipots for the purpoſe. In like manner you may mix the

ſhell

ſhell gold, pouring two or three drops, according to direction, into the ſhell, mixing it with a clean hair pencil, and put a little into a clean Pen.

In hard froſty weather Ink will freeze, by which it loſes its colour. To prevent this (if you have not the conveniency of keeping it warm, or from the cold,) put a few drops of brandy or other ſpirits into it, and it will not freeze. And to hinder its moulding, put in a little ſalt.

It may not now be improper to ſay ſomething of Secret Writing, and the manner of doing it, on which Biſhop Wilkins, in his book of Mathematical Magic, ſpeaks largely; but it is prin-

cipally concerning writing in cypher, which requires great pains, and an uncommon ſhare of ingenuity, both in writers and readers. There are, however, two or three particular ways that are very amuſing and eaſy both as to coſt and pains.

Firſt, If you dip your Pen in the juice of a lemon, or of an onion, or in ſpirits of vitriol, and write on clean paper whatever you intend, it will not be diſcerned till you hold it to the fire, when it will appear legible. And if with any of the forementioned, you write on your ſkin, as on your arm, the back of your hand, &c. it cannot be obſerved till you burn a piece of paper and rub the

the place with the aſhes, when it will appear very plain.

Another way is, when you write a letter that you intend ſhall not be diſcovered but by thoſe you wiſh, firſt to write your thoughts on one ſide the letter with black Ink as uſual, (but it ought to be on thin paper,) and then, on the contrary ſide, go over the ſaid matter that you would have ſecret, with a clean Pen dipped in milk, and that writing cannot be read without holding it to the fire as mentioned before, and then it will appear legible in a bluiſh colour.

A third method is, to have two pieces of paper of equal ſize, and the uppermoſt cut in chequered holes or ſquares, big

big enough to contain any word of ſix or ſeven ſyllables, and in thoſe ſquares write your mind in regular ſenſe; then take off the ſaid chequered paper, and fill up the vacancies with words of any kind, which will render it perfect nonſenſe, and not capable of being read to any purpoſe of intelligence. And tranſmit or ſend the ſaid uppermoſt, or chequered paper, or another of the ſame form, to your correſpondent, and he will be able, by laying it nicely on your letter, to read every ſentence of it, without being perplexed with the words of amuſement intermixed, which make it altogether unintelligible.

Or again, you may write to a friend in good ſenſe with common Ink, and let the

the lines be at ſuch a commodious diſtance that what you intend to be ſecret may be written between them with water wherein galls have been ſteeped, but not long enough to tincture the water, and when dry nothing of the writing between the ſaid lines can be ſeen; but when it is to be read, you muſt, with a fine hair pencil dipped in copperas water, go between the lines, and you make it legible.—This way will give no ground for ſuſpicion, becauſe the letter appears to carry proper ſenſe in thoſe lines that are ſet at a proper diſtance.

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